DOCUMENT RESUME

ED 247 355 UD 023 736

AUTHOR Gersten, Russell; And Others
TITLE The Lasting Impact of the Direct Instruction Follow Through Program: Preliminary Findings of a Longitudinal Study of 1500 Students.
PUB DATE Apr 84
NOTE 39p.; Paper presented at the meeting of the American Educational Research Association (New Orleans, LA, April 1984).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Achievement Gains; Compensatory Education; *Dropout Rate; Economically Disadvantaged; Elementary School Students; Elementary Secondary Education; High School Graduates; *High School Students; Longitudinal Studies; *Program Effectiveness
IDENTIFIERS *Direct Instruction Follow Through Project; *Impact

ABSTRACT

Fifteen hundred high school students who had taken part in the Direct Instruction (DI) Follow Through Program in elementary school were studied to examine the impact of DI on their high school careers. Positive effects were found in each of the six sites studied. Two sites demonstrated positive effects in both achievement and graduation/dropout rate. In four sites, positive effects were found in some areas of high school achievement. In three, 9th grade reading achievement was within 10 percentile points of the national median, indicating that students had maintained the level achieved at the end of Grade 3. In four sites, the dropout rate for DI students was significantly lower than that for non-DI students. Generally, positive effects were stronger in communities with a kindergarten-starting program than a first-grade-starting program. The only two significant negative effects were in math achievement in one site and in the dropout rate of one cohort in another site. (CMG)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED247355

The Lasting Impact of the Direct Instruction Follow Through Program: Preliminary Findings of A Longitudinal Study of 1500 Students

Russell Gersten

Douglas Carnine

Thomas Keating

University of Oregon

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Russell Gersten

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Paper presented at American Educational Research Association; New Orleans, Louisiana

April, 1984

UD023736

Despite the controversy concerning the evaluation of Follow Through (House et al, 1978), if one accepts the premise that standardized achievment tests are a reasonable (if imperfect) method to assess student learning, then it is relatively clear that the Direct Instruction model (Becker, Engelmann, Carnine & Rhine, 1981) was effective in significantly improving the academic performance of the low income students in 20 communities which participated in the program during the primary grades. (Becker, 1978; Bereiter & Kurland, 1981-82; Stebbins et al, 1977). The average scores for the students in the program corresponded to the 49th-50th percentile (i.e. the national median) on the Math, Language and Spelling Subtests of the Metropolitan Achievement Test and the 41st percentile in Reading. Of the nine major Follow Through approaches evaluated, Direct Instruction was the highest ranked in all academic areas but two (Spelling and Vocabulary), where it was second. There was also evidence that the model had a positive impact on the students' self esteem, and increased their sense of responsibility.

Yet, critics of the model assert that the effects of highly structured approaches such as Direct Instruction will dissipate over time. According to this view, without the carefully sequenced lessons, and the careful teacher guidance during initial stages of learning, the students will not be able to work and learn independently. The only way to examine this issue is through longitudinal research, examining the later effects of the program.

Becker and Gersten (1982) examined the later effects of the program on fifth and sixth graders in five sites. Significant positive effects were found in every academic area. However, in most cases the magnitude of the effect was appreciably lower than it had been in the third grade. This is not altogether surprising. We concluded that students appeared to retain the knowledge and problem-solving skills they had mastered in the primary grades. They performed

better than comparable low-income children in their communities who did not attend the program. These enduring effects were strongest and most consistent in WRAT reading (word reading), math problem solving, and spelling. There were lesser effects in science, math concepts, math computation, and word knowledge; no significant effects were found in comprehension.

The fact that this study was conducted at five quite diverse sites for two grade levels and in two different years (1975 and 1976) adds confidence to the results. These results were from sites with a three-year (first through third grades), rather than four-year (kindergarten through third grade) program. For this reason, in all likelihood, the results represent a low estimate of program effectiveness. A quasi-experimental follow-up study by Meyer, Gersten, and Gutkin, (1983) demonstrated that low-income fifth graders from the 4-year program in New York City were performing significantly better than comparison group children, and were well above national median levels in reading on the Comprehension Test of Basic Skills (CTBS). Also, Weber and Fuhrmann (1978) reported significant later effects in reading and math on the California Achievement Test for ninth graders in one urban site who had completed the program; Follow Through graduates were .24 standard deviation units (or .8 grade equivalent units) ahead of comparable students in the district.

The present study examines the impact of the Direct Instruction (DI) program on the high school careers of the economically disadvantaged students who participated. The study involves six sites; some had a four year Follow Through (FT) program (kindergarten through third grade), others only had a three year (first through third grade) program. Two sites offered a three year program in the early years and later expanded to include kindergarten.

Hypotheses and Expectations

The following hypotheses seemed reasonable, if in fact, an above average academic program had been presented to these low income children in the primary grades:

1. The longer children stayed in the program, the better the performance measured at a later time. Thus, students in the four year program (K to 3) would tend to benefit more than students in a 3-year (first to third grade) program.

2. The lower the quality of the district's traditional program for the years following the intervention, the lower the overall performance for both Follow Through and comparison students at a later time. This can be gauged by both groups' standing on norm-referenced achievement tests administered in junior high and high school relative to the national norm sample.

3. The difference between Follow Through students' performance and local comparison students' performance will be due to two primary factors:

   a) the quality of implementation of the FT program, and

   b) the quality and quantity of instruction in the comparison schools.

Thus even though students were demographically similar in both the Flint and NYC studies, it might be easier to demonstrate an effect in the program in New York City's District 23 (which at the time of the study had the very lowest reading scores in New York City) than in Flint, Michigan (where the quality of "traditional" academic instruction to low income elementary students was always reasonably adequate). (See Gersten, 1982 or Bereiter & Kurland, 1981-82 for elaboration). Again, examining norm-referenced data on third-grade achievement, along with data on statistical comparisons, allows the reader to examine this issue.

Basically we believed that the more positive the initial learning experien-

ces, the stronger the expected tendency for children to stay in school (rather than drop out). Although the program would interact with the quality of instruction received by the students in the succeeding nine years, there should be some lasting positive effects. The ability to read, and solve basic mathematical problems should provide real benefits to students throughout those years. Results reported here are, in some cases, preliminary. Final analyses are currently being conducted.

METHOD

Sample

All ten sites currently working with the Direct Instruction Follow Through model were eligible to participate. And in fact, all districts agreed to cooperate. However, in four cases, conduct of the study was impossible for the following reasons:

1. The district did not have a certified high school, and thus no systematic records on high school students.

2. The district could not provide records necessary for either a comparison-group design or an interrupted time series design, due to the never-ending series of changes in busing and redistricting of neighborhood schools.

3. The sample size was insufficient (less than 12 per cohort) to conduct a longitudinal study.

4. The neighboring district refused to release comparison group data. The feasibility of an interrupted time series design is still being pursued at this site.

Thus a total of six sites were involved in the study---representing a range of ethnic groups, locale, and degree of implementation.

The following sites comprised the urban sample:

1. Emerald City (an urban site that chose to remain anonymous)

Figure 1: Sites Participating in the Study

Site	Number of Cohorts	Evaluation Design	Average N per Cohort	Number of FT Schools
Urban				
Emerald City	2	Comparison Group	80	4
Flint	2	Comparison Group	62	2
New York City	2	Comparison Group	20	1
Rural				
Williamsburg	2	Comparison Group	70	2
Uvalde	4	Advanced Control (Time Series)	80	2
Cherokee	4	Advanced Control (Time Series)	55	1

2. Flint, Michigan

3. New York, NY

The following sites comprised the rural sample:

4. Williamsburg County, South Carolina

5. Uvalde, Texas

6. Cherokee, North Carolina.

Insert Figure 1 about here

Figure 1 presents, for each site: a) the number of cohorts evaluated; b) type of evaluation design; c) average number of subjects per cohort; d) number of schools involved in the FT program.

Design

Of the six sites, four utilized a non-equivalent comparison group design. The Non-Follow Through, or comparison, schools were matched with the Follow Through schools according to a) percentage of students receiving Aid to Families with Dependent Children (AFDC), b) proportion of students receiving free lunch, c) ethnicity, and d) where possible, reading scores at the schools prior to the inception of Follow Through. At these sites, only students in the Follow Through or Non-Follow Through program for three full years (first through third grade) were included in the sample. Thus, in a K-3 site such as Flint or New York, a student in Follow Through for only 3 of the 4 years was included in the study.

The remaining two sites utilized an interrupted time series (advanced control group) design due to the unavailability of suitable matching schools. Data from the year immediately prior to the implementation of Follow Through and from the group which received two years of Follow Through were compared to groups receiving 3 or 4 years of Follow Through.

Subjects

Generally, to qualify for the sample a child attended Follow Through classrooms for at least 3 years. To qualify as a member of a comparison group, students attended a school demographically similar to a Follow Through school (as determined by proportion of AFDC and free lunch, and ethnicity) continuously for grades one through three.

Measures

The amount of information which was available to us varied from site to site. In general, we gathered the following types of measures:

1. Achievement. Scores on standardized achievement test from ninth, tenth, and/or eleventh grades. These tests were administered by the individual school districts as part of their district-wide testing program. The level and form for each test are presented along with the results for each site.

   a) California Achievement Test (Emerald City and Cherokee)

   b) SRA Achievement Test (Flint and Uvalde)

   c) Comprehensive Test of Basic Skills (Williamsburg County)

The city wide reading and math tests varied year to year in New York City.

2. Student Status data. This included:

   a) graduation/drop out information

   b) whether or not students were retained

   c) college application and/or acceptance (if the district kept records. Surprisingly, several districts did not.)

   d) high school attendance

Originally, we also attempted to gather data on special education placement as Schweinhart and Weikart (1980) had done. However, we found virtually no cases of special education referrals in either Follow Through or comparison groups at any site. (For example, in Flint, the special education placement rate

was approximately 2 percent. It was even lower in other sites.) This may be because many of these students were in school prior to the passage of Public Law 94-142, or to the fact that the bulk of special education placements are done prior to third grade.

Procedures

Achievement Test Scores. Generally, test scores were reported as standard scores (expanded scale scores) or normal curve equivalents (NCE's). All calculations were performed on the standard scores (or NCE) since they are interval scales. Sample means were ulimately converted to percentiles and grade equivalent scores to give the reader a sense of how these students compare to the standardization sample. There are two exceptions. One site (Cherokee) used grade equivalent scores in the reporting of the earlier cohorts, and NCEs for later cohorts. The GEs were converted to NCEs following publisher norm tables. Both mean NCEs and median GEs are reported. In New York City, only grade equivalent scores were available.

"Total" scores for Reading, Math and Language each were used in the analysis for most sites. In Emerald City, separate analyses were done on the Math subscales since we expected different patterns in Math Concepts than Math Computation based on the Becker and Gersten (1982) study.

The total sample size for achievement test data in each site was always a bit less than the sample size for student status (graduation/drop out) data. Several reasons for this were offered. Schools are legally obligated to keep records on graduation (or drop out), but not on achievement. Some students were absent on testing days. In fact, we suspect that some students simply did not show up during testing week. Others had dropped out of school prior to 10th or 11th grade (and in some cases, even 9th grade) testing. These proportions varied from site to site and cohort to cohort. For example, in Williamsburg Cohort II,

with a total of 127 students for whom graduate status data could be obtained, achievement test scores in reading, language, and math were available for 88 (70%) of those 127. In Cohort III graduation status data was available for 98 students while test scores for 81 (83%) were obtained in reading, language, and math.

Student Status Data (Graduation, Dropout Rate, Retention, College Applications)

As mentioned above, the amount and types of status data varied somewhat among sites according to the degree of contact maintained between high schools and their graduates, drop-outs, etc. In the smaller rural communities, guidance counselors were more likely to know who went on to attend college. In larger urban areas, the file would only list colleges applied to, not whether or not a student was accepted. In some areas, it was relatively easy to obtain GED information from a community college or county certification office. In larger districts, there was often no such linkage; GED information was unavailable.

We were interested in any of a number of dimensions which might give additional insight into the indirect effects of enhanced academic performance. If one group of students shows better achievement scores in reading, math, or language, is this reflected also in higher rates of graduation, lower drop-out rates, etc.? Desirable student status data included: (1) graduation (early, on time, or late), (2) dropout rate, (3) retentions (one or more years), (4) proportion of students who returned to obtain a graduate equivalency diploma (GED), (5) college applications and, where possible, college acceptance.

Graduation, Dropout Rate, Retention. In obtaining the information for a given cohort, our procedure was to obtain the graduation list for the "target" graduation year and the lists for two years prior to and after that year. This was necessary in order to keep subjects grouped by cohorts, since a given graduating class will contain students graduating early, on time, or late, all from

different cohorts. In addition, we examined the current 9th, 10th, 11th, and 12th grade rosters for the target year, to determine students who were retained at some point during their school careers. The permanent records of these students were then examined to determine the year(s) they were retained. (This was not always possible; in several districts, records were unclear on this topic.) Each spring, the researchers checked on the progress of the retained students to see if they had graduated, were still in school or had dropped. It was not uncommon for students to have been retained more than twice.

Access to school "drop" files was also essential. Initial efforts to obtain these were met with varying degrees of reluctance on the part of school officials, though ultimately all districts proved to be cooperative. Often, the "drop" files were organized on a year-to-year (rather than an alphabetical) basis. They often included both students who dropped out of school and those who moved out of town. Days of systematic rummaging through file cabinets, rosters, and counselor's lists were necessary to determine whether a child had dropped out of school.

Graduation Equivalency Diploma (GED). Sometimes information on GED was obtainable from school counselors. In some communities, a representative from the county continuing education division provided us with information. A GED was coded as a graduation; these are footnoted on the tables reporting results. There were very few GEDs in the study.

Moved. Some sites maintained a "move" file which allowed us to determine kids who had left and should not be tracked for further information. School counselors were also helpful in this area since move files, when available, were often incomplete. In one site, Cherokee, counselors had such complete information on students who had moved from site schools to schools outside the study that we were able to get graduation data on many of those students.

Students who did not appear in any of the graduation lists, current 9th, 10th, 11th, or 12th grade rosters, or the "drop" file were assumed to have moved from the district and were omitted from the study.

College Application, Acceptance. In sites where college data of any kind was available, we used college applications as a point of comparison rather than acceptance or attendance. While schools would have records of transcripts sent to specific colleges, information on whether students were actually accepted was scanty and more hearsay than anything else.

PRELIMINARY RESULTS

The following notation is used to number cohorts for all sites with a comparison group design. The group that began Follow Through in 1968 is called cohort 1, the 1969 group cohort 2, the 1970 group cohort 3. In the case of Flint and Williamsburg County, Follow Through did not begin until 1969; thus there is no cohort 1. For the 2 sites with a time series design, somewhat different notations are used.

Urban Sites

The median family income for Emerald City is among the ten lowest for urban areas in the U.S. The student population is over 98 percent Black. It was one of the largest Follow Through sites. In 1968, Follow Through was a first through third grade program. In 1970, the program was expanded to include kindergarten. The current data base includes three first grade starting cohorts (1968, 1969, 1970) and one kindergarten starting cohort (1970, the year public school kindergarten classes began). The convention used for this site is that the group that began in 1968 is labeled cohort 1, the 1969-starting group cohort 2, the group that began first grade in 1970 is cohort 3. The group that began Follow Through in kindergarten in 1970 is called 3-K.

Table 1a

Emerald City 9th Grade Achievement (California Achievement Test, Level 5, Form B, 1970 edition)

Cohort	N	%ile	M[a]	S.D.	G.E[b]	t	Magnitude[a]
Reading							
1 Follow Through	118	22nd	489.4	7.14	7.2	2.09*	.25
Comparison	158	17th	471.8	67.3	6.7		
2 Follow Through	64	20th	479.3	77.4	7.0	1.70*	.25
Comparison	168	14th	460.4	74.7	6.3		
3 Follow Through	59	23rd	493.7	59.4	7.4	2.01*	.31
Comparison	138	18th	474.6	62.4	6.9		
3-K Follow Through	54	40th	538.0	72.6	8.8	2.99**	.49
Comparison	121	26th	500.4	78.6	7.6		
Language							
1 Follow Through	114	25th	497.7	93.1	7.3	.23	.03
Comparison	153	24th	495.4	64.3	7.2		
2 Follow Through	62	24th	495.1	108.9	7.2	.95	.14
Comparison	159	20th	480.3	88.9	6.7		
3 Follow Through	55	42nd	543.0	91.6	8.9	1.72*	.28
Comparison	135	33rd	520.5	77.3	8.1		
3-K Follow Through	51	59th	583.0	97.2	10.2	3.12**	.53
Comparison	112	39th	536.0	85.4	8.6		
Math							
1 Follow Through	114	18th	475.1	76.1	7.3	2.11*	.26
Comparison	155	14th	456.7	63.2	6.8		
2 Follow Through	58	15th	460.2	74.0	6.9	.54	.08
Comparison	154	13th	454.2	72.3	6.7		
3 Follow Through	58	19th	482.1	69.2	7.4	.76	.12
Comparison	139	18th	474.0	67.0	7.2		
3-K Follow Through	53	30th	512.6	62.6	8.3	2.75**	.46
Comparison	117	20th	483.3	65.0	7.5		

a in pooled standard deviation units

b %ile and G.E. are converted from Mean Scale Score

* $p < .05$, one tail

** $p < .01$, one tail

Table 1b

Emerald City Graduation and Drop-Out Rates

Cohort	n	% Graduation	% Drop-outs	t
1				
Follow Through	122	82	20	
Comparison	200	72	28	2.05*
2				
Follow Through	97	68	31	.36
Comparison	237	70	30	
3				
Follow Through	75	63	35	2.99**
Comparison	232	80	17	

a Includes 2 GED's in F-T sample
* $p < .05$, two tail
** $p < .01$, two tail

The fact that there are only two high schools in the district made data collection easier than in sites where elementary and junior high students dispersed into many different high schools, as was the case in New York. The student mobility factor is extremely low for an urban district.

There are consistent positive effects in academic achievement (see Table 1a). The most dramatic effects are found for cohort 3-K, the first group to experience four full years of the Direct Instruction Follow Through program. In 9th grade Reading, they are at the 40th percentile (almost grade level), while the comparison students are at the 26th percentile. In Language, they are actually above grade level (58th percentile vs. 35th for the comparison group). In Math, they are at the 29th percentile, while the other students from the district are at the 18th.

The three previous cohorts also show significant effects in Reading, but not consistently in Math or Language.

The data also show that there were significantly fewer high school dropouts for the first cohort of Follow Through students (Table 1b). The dropout rate is 20 percent for the Follow Through students and 28 percent for the comparison group, a significant positive difference. For cohort 2, it was 31 percent for Follow Through and 30 percent for the comparison group. For cohort three it was 35 percent for Follow Through students and 17 percent for the comparison group, a significant negative difference.

Flint, Michigan. Table 2a presents the achievement results for Flint, Michigan; table 2b shows the mean high school grade point average (GPA). The mean scale score for each subtest on the SRA Achievement Test is converted to a percentile.

In Flint, the study involved two cohorts -- cohort 2 (beginning K in 1969,

Table 2a

Flint, Michigan Ninth Grade Achievement (SRA Test)

Cohort	n	%ile	Mean Standard Score	S.D.	t
			Reading		
Cohort 2					
Follow Through	74	29th	382.9	169.1	1.13
Comparison	27	22nd	335.3	192.6	
Cohort 4					
Follow Through	51	34th	416.2	176.7	1.18[a]
Comparison	28	25th	357.1	230.2	
			Mathematics		
Cohort 2					- .77
Follow Through	72	30th	390.7	181.3	
Comparison	28	35th	420.1	167.5	
Cohort 4					
Follow Through	51	50th	500.7	132.3	2.51*
Comparison	28	31st	403.4	179.8	
			Language		
Cohort 2					
Follow Through	71	28th	383.2	194.1	- .57
Comparison	28	32nd	409.3	211.6	
Cohort 4					
Follow Through	51	35th	421.3	167.3	1.30[a]
Comparison	27	25th	358.6	219.1	
			SRA Composite		
Cohort 2					
Follow Through	72	27th	373.6	173.1	- .38
Comparison	25	30th	389.7	182.5	
Cohort 4					
Follow Through	51	40th	453.9	154.5	1.66*
Comparison	27	28th	380.6	200.8	

[a] $p < .15$, two tail

* $p < .05$, two tail

Table 2b

Flint, Michigan Mean High School GPA's

Cohort	n	M	S.D.	t
Cohort 2				
Follow Through	79	1.89	.87	.76
Comparison	31	1.73	1.06	
Cohort 4				
Follow Through	60	1.81	1.03	1.21[b]
Comparison	39	1.55	1.03	

Table 2c

Flint, Michigan Attendance and Retentions

Cohort-Group	N	Adequate Attendance	t	Retained	t
Cohort 2					
FT	97	75.6%		34.1%	1.11
Comp.	39	47.2%	3.13***	44.4%	
Cohort 4					
FT	63	82.8%		12.1%	2.84**
Comp.	43	67.5%	1.81*	35.0%	

* $p < .05$
** $p < .01$
*** $p < .001$

the first year of implementation in that community) and cohort 4 (beginning K in 1971). Status data on cohort 4 will be coming in this summer. In both cohorts, Follow Through achievement is higher than comparison group performance in Reading. Neither effect is significant, however. Significant positive effects were found in Math and on the SRA composite score for cohort 4. The results in Language, Reading, and GPA approach significance, $p < .15$. No significant differences were noted for Cohort 2. Our supervisors reported that the program was better implemented for Cohort 4 students; teachers had two extra years to learn the model.

The ninth grade results for Cohort 4 Follow Through students are at the national median in Math. This was approximately the level of their performance at the conclusion of the program (Stebbins et al, 1977). There is evidence that Flint students maintained their superior performance six years after the program had ended. Their ninth grade Reading scores are also at about the same levels as their third grade standardized achievement scores, the 34th percentile.

For both cohorts in Flint, fewer Follow Through students were retained (see table 2c) than comparison students (34 versus 45 percent for Cohort 2; 12 versus 35 percent for Cohort 4. These results are significant for cohort 2 and cohort 4. Significantly fewer FT students demonstrated attendance problems (10 or more absences) during the 1981-82 academic year.

New York City. The Direct Instruction program in New York City was implemented in only one school, P.S. 137. The New York City sample is thus the smallest in the study. The school is located in the Ocean Hill-Brownsville section of the city (District 23). At the time of the study, District 23 was consistently one of the two lowest achieving districts in the city.

During the early years of Follow Through (the years evaluated in this longitudinal study), New York City was one of the best implemented and most effec-

Table 3a

New York City Cohorts 1, 2, and 3 and Aggregated 9th Gr. Mean Grade Equivalents in Reading and Math[a]

Cohort	n	Mean GE	S.D.	t	Magnitude
			Reading		
1					
FT	16	9.6	2.22	2.60**	.83
Comp	26	7.6	2.54		
2					
FT	17	8.5	2.16	.90	.27
Comp	30	8.0	1.92		
3					
FT	29	9.4	2.24	.75	.19
Comp	37	8.9	2.59		
Aggregate (1,2,3)					
FT	60	9.2	2.22	2.55**	.42
Comp	93	8.2	2.42		
			Math		
1					
FT	17	8.3	2.13	.67	.21
Comp	27	8.0	2.67		
2					
FT	17	8.1	2.52	.75	.23
Comp	29	7.6	1.78		
3					
FT	29	9.0	2.35	1.24	.31
Comp	38	8.3	2.23		
Aggregate (1,2,3)					
FT	61	8.6	2.33	1.71*	.28
Comp	93	8.0	2.33		

a Adapted from Meyer (1984)
* $p < .05$
** $p < .01$

Table 3b

New York City Aggregated Cohorts 1, 2, and 3 Students: Graduated, Retained, Dropped Out, and Accepted for College[a]

Category	Follow Through (N = 65)	Comparison (N = 100)	t
Graduated	59.5%	37.6%	58.12***
Dropped Out	27.7%	46.0%	- 6.61***
Retained	21.4%	32.6%	- 3.42***
Accepted to College	34.0%	17.0%	12.3***

a Adapted from Meyer (1984)

*** $p < .001$

tive sites using the Direct Instruction model. As can be seen in Tables 3a and 3b the results in New York City are the most impressive in the study. The study is reported in detail in Meyer (1984).

In ninth grade reading, Follow Through students perform consistently better than local comparison students. Two of the cohorts (1 and 3) are close to grade level, with mean Grade Equivalent scores of 9.6 and 9.4. The effect is significant for the aggregated sample and cohort 1. In math, the magnitude of the effect is smaller, but it is significant for the aggregated sample. The mean GE score is 8.6, over a year below grade level, but still appreciably higher than the mean score for the comparison group of 7.95. This pattern, of reading surpassing math, is true for most sites.

The most impressive results are in the student status information. Significantly more Follow Through students graduated (59.5%) than comparison students (37.6%). Conversely, significantly fewer dropped out of school (27.7% vs. 46%). Significantly fewer FT students were retained (21.4 vs 32.6%). Finally, significantly more were accepted at college (34 vs 17%). There is consistent evidence that Follow Through had a significant enduring impact on these students' lives, at least the academic aspects of their lives. One sobering aspect of these findings is that, despite the high achievement level and the significant positive effects, so many FT students did drop out of school. None (34 percent of these students, from the lowest achieving districts in the city) was accepted to college.

Rural Sites

Williamsburg County, South Carolina is a rural, agricultural community. When Follow Through began, it had one of the highest illiteracy rates in the country. Student status information is reported in Table 4b. (Note the percent graduates and percent dropouts do not add to one hundred because of retentions.)

Table 4a

Williamsburg County, S.C. 11th Grade CTBS Reading, Language and Math

Cohort	N	M	S.D.	t	Magnitude[a]
			READING		
2					
Follow Through	88	482.3	82.2	-.49	-.08
Comparison	54	489.5	86.3		
3					
Follow Through	80	509.4	64.2	.86	.15
Comparison	53	498.2	79.2		
			LANGUAGE		
2					
Follow Through	88	494.9	79.1	-.54	-.09
Comparison	54	502.6	85.6		
3					
Follow Through	80	523.3	75.0	1.68	.30
Comparison	53	499.8	84.1		
			MATH		
2					
Follow Through	90	467.7	80.6	-3.39**	-.58
Comparison	54	512.6	70.6		
3					
Follow Through	80	475.8	80.9	-1.86	-.33
Comparison	53	503.8	91.3		

** $p < .01$

a Magnitude of effect in pooled SD units

Table 4b

Williamsburg County, S.C. Graduation, Drop-Outs and Still in School

Cohort	N	% Grad.	% Drop	% Still In School	X^2
2					
Follow Through[a]	131	94	6	2	4.92*
Comparison	71	82	15	3	
3					
Follow Through	99	86	8	6	.88
Comparison	71	83	7	10	

[a] includes 2 GED's in FT sample
* $p < .05$

Table 4c

Williamsburg County, S.C., Percent of Students Who Graduate Were Retained During Grades 4 to 12

Cohort	N	% Retained	% Graduated on Time (or early)	X^2
2				
Follow Through	131	33	60	6.08*
Comparison	71	45	36	
3				
Follow Through	99	11	75	2.87
Comparison	71	15	62	

[a] These are retained students who graduated one or more years behind schedule

[b] Includes 2 GED's in FT sample

* $p < .05$

For both cohorts, significantly more Follow Through students graduated from high school. The difference is 83 versus 71 percent for cohort 2 and 75 versus 70 percent for cohort 3. For cohort 2, there is a significant difference in dropout rate; final data are not yet in for cohort 3. Significantly more cohort 2 Follow Through students were accepted to college (27 versus 13 percent); the results for cohort 3 are not significant.

Some retentions have yet to graduate. Results are not significant for achievement differences in Reading and Language. There is a significant negative effect in math. This is the only negative effect in achievement in the study.

Uvalde, Texas. Over 99 percent of the Follow Through students are Chicano. Many enter first grade with little or no knowledge of the English language.

The DI Model was implemented in the first grades in Uvalde in the fall of 1968. Table 5 reports on the status data for students who entered first grades in the fall of 1966, 1967, 1968, and 1969. The students from the two years prior to Follow Through are compared with those from the first two years of Follow Through.

The results do not show appreciable differences between ninth grade Follow Through and Non-Follow Through students in achievement scores or high school grade averages, but such differences may be concealed by the differences in retention and dropout rates. If low performing students are given an extra year to learn, they can make gains that would help to mask a Follow Through advantage. This selective factor may mask true Follow Through/Non-Follow Through differences.

Table 5 shows that a higher percentage of Follow Through students graduated than for the two preceding classes of students. It also shows that there were fewer retentions among Follow Through students, and especially after the first year.

Table 5

Uvalde, Texas High School Graduated and Retained Students

Cohort	N	% Graduated
A (Comp)	103	37.9
B (Comp)	87	42.3
1 (FT)	87	59.8
2 (FT)	47	53.2

Cohort		% Retained
A (Comp)	103	43.6
B (Comp)	87	48.8
1 (FT)	87	42.5
2 (FT)	47	23.0

		% with Acceptable Attendance
A (Comp)	97	55.7
B (Comp)	101	59.4
1 (FT)	90	68.9
2 (FT)	54	83.3

Table 5 about here

High school attendance was also examined. A student was considered to have good attendance if the student was absent for 10 or less days during the year. There were significant differences favoring Follow Through for ninth grade attendance.

Cherokee, NC. Cherokee, North Carolina, is an Eastern Band Cherokee Indian community in which the students attend a Bureau of Indian Affairs (BIA) school. In 1970, the Direct Instruction Follow Through program was simultaneously implemented in kindergarten, first, and second grades. Third graders from that year who did not have Follow Through (FT), and second graders who would receive only two years of FT, served as advanced control groups in a time series design. Children starting in kindergarten or first grade that year and receiving three or four years of FT were considered the FT, or experimental, groups. All succeeding kindergarten starters received four years of FT.

Aside from some attrition due to students transferring from the BIA Cherokee high schools to various area public high schools, the Cherokee site presented fewer logistical problems than most other sites. The close-knit nature of the community also allowed us to better track students' post-high school status, and often we even were able to determine the graduation status of those students who had transferred to public schools.

Tables 6a, 6b, and 6c show results from Cherokee. The results for Reading show a progressive improvement as the students received more years of Follow Through. In 9th grade, the median Grade Equivalent for the Non-FT group was 7.8 while the median for the four-year FT group was 9.3. The effects in Math are not significant; all cohorts are close to grade level. The cohort with 4 years

Table 6a

Cherokee, N.C. Ninth Grade Achievement

(California Achievement Test, level 5, Form B, 1970 Edition)

Trend Analysis (Interrupted Time Series)

Cohort	Yrs. Follow Through	N	%ile[a]	Median G.E.	Mean NCE
		Reading			
0	0 yrs.	45	28th	7.8	38
1	2 yrs.	67	30th	8.0	40
2	3 yrs.	60	38th	8.7	46
3	4 yrs	57	46th	9.4	49
		Language			
0	0 yrs.	44	49th	9.6	58
1	2 yrs.	67	40th	8.7	46
2	3 yrs.	60	32nd	8.0	43
3	4 yrs.	57	48th	9.5	51
		Math			
0	0 yrs.	44	31st	8.4	42
1	2 yrs.	67	29th	8.2	40
2	3 yrs.	60	31st	8.4	41
3	4 yrs.	57	33rd	8.6	46

[a] %ile converted from Median G.E.'s

U.S.

Table 6b

Cherokee, N.C. 10th Grade Achievement

(California Achievement Test, level 5, Form B, 1970 Edition)

Trend Analysis

Cohort	Yrs. Follow Through	N	%ile[a]	Median G.E.	Mean NCE
		Reading			
0[a]	0 yrs.	46	39th	10.0	45
1[b]	2 yrs.	62	41st	10.1	45
2	3 yrs.	47	39th	10.0	47
3	4 yrs.		--		
		Language			
0[a]	0 yrs.	46	47th	10.5	48
1[b]	2 yrs.	62	47th	10.5	50
2	3 yrs.	49	52nd	10.9	49
3	4 yrs.		--		
		Math			
0[a]	0 yrs.	46	21st	8.5	36
1[b]	2 yrs.	62	40th	9.9	42
2	3 yrs.	49	30th	9.1	42
3	4 yrs.		--		

[a] Mean NCE for this cohort obtained by converting mean G.E.

[b] Mean G.E. for this cohort obtained by converting mean NCE.

-- No 10th grade scores were available for this cohort, due to irregularities in districtwide testing

Table 6c

Cherokee, N.C. Graduation and Dropouts

COHORT	Yrs. Follow Through	n	% Dropped Out
0	0 yrs	79	44
1	2 yrs	101	44
2	3 yrs	97	34
3	4 yrs	99	35

[a] includes 1 GED

of FT is within a few percentile points of the national average. The Language test (grammatical usage) fails to show a consistent trend, but all groups performed well on this test.

Tables 6a, 6b and 6c about here

Final graduation data for the four-year FT group will not be available until June of 1984. There is a strong trend towards a decreased dropout rate. Non-FT students had a dropout rate of 38 percent, the group with two years of FT was 37 percent, the three-year group 25 percent, and the four-year group 22 percent. These findings basically parallel achievement scores at the end of third grade.

Summary. Analysis of the high school data shows that the Follow Through students:

a) were more likely to receive a high school diploma,

b) were less likely to be retained in any grade,

c) show better attendance in 9th grade.

Discussion

In each site, at least two cohorts of children were evaluated. Positive effects were found in each site. Two sites demonstrated effects in both achievement and dropout status (Cherokee and New York). In some sites, these effects were in achievement but not dropout rate, (e.g. Emerald City, were the dropout rates were ambiguous) while in others, significant effects were found in graduation/dropout rates but not achievement. The latter phenomenon was found in the two rural sites with three year programs -- Uvalde, Texas, and Williamsburg County, South Carolina. These two communities have high illiteracy rates and are among the poorest in the country. The three years of the intervention may not have been sufficient, considering the extreme educational problems in these communities. The only two significant negative effects found

were math achievement in Williamsburg County, S.C., and grad/drop rate in Emerald City cohort 3.

Participation in the Direct Instruction Follow Through program tended to lead to a lower likelihood of a student dropping out, and a greater likelihood of students applying to college. In four of the six sites, positive effects were found in some areas of high school achievement. In three of the six communities, ninth grade reading achievement was within ten percentile points of the national median, that is, close to grade level, and appreciably above the levels typically attained by low income students (NAEP, 1979). In these sites, students were performing at approximately the same level they were at by the end of third grade, indicating the effects had been maintained six years later. This is an exciting finding. It is gratifying to see adolescents from one of the poorest sections in New York City (long known for its poor achievement) perform at grade level in reading in junior high, six years after the program ended. Generally, the 9th and 11th grade Reading scores are higher than the Math scores. Interestingly enough, the reverse pattern was true in Flint. It appears that the math instruction in the majority of the districts evaluated, from fourth grade onwards (with the exception of Flint) is fairly weak.

In four of the six sites, significantly fewer Follow Through students dropped out of high school, again indicating that the program effects appear to have endured. Generally, effects were stronger in communities with a kindergarten-starting program than a first-grade-starting program. Sample sizes ranged from 26 per cohort (New York City) to 118 per cohort (Emerald City).

Implications. These findings suggest that the belief held by Congress in the 1960's, that providing effective academic programs to disadvantaged students in the early years of school would have a positive impact on their lives, was sound.

The six studies consistently show that three or four years of an effective, academically oriented program in the primary grades had an enduring, positive impact on the students' lives. At each site, there were positive effects in either the proportion of students who successfully graduate from high school, or in academic achievement scores. Effects were replicated across sites and across cohorts of students, though the magnitude of the effects varies.

These results shed further light on the "site variability" issue discussed by House et al (1978) in their critique of the original Follow Through evaluation. Very different things happened at the various sites. Some were disturbing. While the ninth grade reading scores were quite high for New York City (median of 95) remember that 40 percent of these students dropped out of high school. Though this is significantly less than the comparison group dropout rate of 58 percent, it is far from ideal. On the other hand, in South Carolina, despite the significant decrease in dropout rate, mean reading and math scores correspond to a sixth grade level.

The data from Emerald City and Cherokee seem to support the conclusion that the longer students were in the Direct Instruction program, the stronger the later effects. Students with an academically oriented kindergarten program appear to benefit the most. The findings lead one to speculate on what effects a comprehensive, empirically validated K-6 or K-8 program could have on educationally "at risk" students.

Author Notes

The authors wish to acknowledge the cooperation of the six districts in allowing us access to this highly sensitive data. The following administrators were helpful well beyond the call of duty - Ernest R. Reeves, Dr. James Clayborne, Edward Hansberry, Thomas Minter, Joann Asciuto, and Carlos Edwards.

Almost a hundred people participated in some phase of this project. Primary on-site data collection was coordinated by Wanda Hardin in Flint, Sharon Taylor in "Emerald City", Linda Meyer and Carol Walter in New York, Robert Taylor, Gary Davis, Odelle Bartel and the late Ida Pinckney in South Carolina, Kathy Knippa in Uvalde, and Mary Ann Widenhouse and Ed Sharpe in Cherokee. Debbie Westvang was the primary computer programmer. Linda Meyer contributed to the analyses of the New York City data. Scott Martinson served as overall research coordinator for a year; his mixture of fervor and patience in organizing and verifying the data is much appreciated. W.A.T. White provided meticulous organization and preliminary analyses of the Flint and Uvalde data sets.

Appendix

Graduation and Drop Out Data for Williamsburg County, Emerald City and Cherokee Sites: Summary Table

Cohort	n	Graduation % Grad	P	Drop-Outs % Drop	P
Williamsburg					
2					
Follow Through[a]	131	94	*	6	*
	71	82		15	
3					
Follow Through	99	86		8	
Comparison	71	83		7	
Emerald City					
1[a]					
F-T	122	82		20	*
Comp	200	72		28	
2					
F-T	97	68		31	
Comp	237	70		30	
3					
F-T	75	63		35	*
Comp	232	80		17	
Cherokee					
1 (0 Yrs F-T)	79	56		44	
2 (Comparison)	101	54		44	
3 (F-T)	97	60		34	
4 (F-T)	99[b]	53		35	
New York					
Aggregated (1,2,3)					
F-T	65	59.5	***	27.7	***
Comparison	100	37.6		46.0	
Uvalde					
A (Non-FT)	103	37.9		---	
B (Non-FT)	97	42.3		---	
1 (FT)	87	59.8		---	
2 (FT)	47	53.2		---	

a includes 2 GED's in FT Sample
b 12 still in school
--- drop information not available
* $p < .05$
*** $p < .001$

References

Becker, W. C. (1977). Teaching reading and language to the disadvantaged--What we have learned from field research. Harvard Educational Review, 47, 518-543.

Becker, W. C., & Gersten, R. (1982). A follow up of Follow Through: Meta-analysis of the later effects of the Direct Instruction Model. American Educational Research Journal, 19, 75-93.

Becker, W. C., Engelmann, S., Carnine, D. W., & Rhine, W. R. (1981). The direct instruction model. In W.R. Rhine (Ed.), Encouraging change in America's schools: A decade of experimentation. New York: Academic Press.

Bereiter, C., & Kurland, M. (1981-82). Were some Follow Through models more effective than others? Interchange, 12, 1-22.

Gersten, R. (1982, March). The site variability issue in Follow Through revisited: Some new data, some new methodologies, and new insights. Paper presented at AERA, New York, NY.

Gersten, R. (1981). Final reports submitted to Joint Dissemination Review Panel (JDRP) of the U.S. Department of Education/NIE for Direct Instruction Projects in Williamsburg County, SC; New York, NY; East Las Vegas, NM; Uvalde, TX; Cherokee, NC. NIE/Department of Education.

House, E., Glass, G., Mclean, L., & Walker, D. No simple answer: Critique of the Follow Through evaluation. Harvard Educational Review, 42(2), 128-160.

Lazar, I., Hubbel, V.R., Murray, Rosche, M., & Royce, J. (1977). The persistence of preschool effects. Department of Health, Education, and Welfare, Publication No. (OHDS) 78-30130.

Meyer, L. (1984). Long term academic effects of the Direct Instruction Project Follow Through. Elementary School Journal, 84, 380-394.

Meyer, L., Gersten, R., & Gutkin, J. (1983). One came through: Supervisory and administration factorsthat led to a Follow Through success story. Elementary School Journal, 84, 241-252.

Schweinhart, L.J., & Weikart, D.P. (1980). Young children grow up: The effects of the Perry preschool program on Youths through age 15. Ypsilanti, MI: High Scope Educational Research Foundation.

Stebbins, L., et al. ( ). Education as experimentation: Planned variation model. Vol. IVA-D. Cambridge, MA: Abt Associates.

Weber, B., & Fuhrmann, M. (1978, April). A study of District A's former Follow Through students' retention of basic skills after six years out of the program. Paper prepared for District A.